

# Combining Different Data-Sources for User Modelling in Personalized Learning

Maroš UNČÍK\*

*Slovak University of Technology  
Faculty of Informatics and Information Technologies  
Ilkovičova 3, 842 16 Bratislava, Slovakia  
maros.un@gmail.com*

The trend of using e-learning systems is progressively growing and opportunities that the Web 2.0 provides are huge. Nowadays, e-learning systems offer more and richer content, enable communication and collaboration among users. The rise in use of these systems causes information overload. The adaptive e-learning systems are trying to address the most crucial issues, which are related to this overflow: (1) adaptive systems present only information, which is appropriate and/or interesting for him/her at the moment, (2) help user to choose the way to proceed when viewing content, (3) prevent user from getting lost in the content and/or avoid to prevent him/her from forgetting the original objectives.

To allow such personalization web-based e-learning systems monitor characteristics of individual users, including modelling of their skills, knowledge and/or interests. The performance of such systems is derived from an important element – the user model, which is used to minimize error rates and learning time.

A lot of problems in the domain of user modelling were identified. Combinations of several different inputs entering the user modelling process or the use of information about user beyond the adaptive system to enrich the user model are just two of them. Another challenge, the scrutability, concerning the visibility of the user model to users, is also closely related. In most of the systems, the user cannot directly access the user model and cannot provide explicit feedback about him/her, which could be otherwise taken into account. Much work has been devoted to resolve these problems.

Modelling of user model generally includes three steps [1] that take place in cycle (see Figure 1). In our work we deal with two of them: data collection and how it affects the user model. Our aim is to design a transparent user model, with data collection isolated from the construction of user model itself. We work with several sources of input for user modelling.

We also consider the visualization of user model from user's point of view, which allows direct and explicit feedback from students to enrich the user model.

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\* Supervisor: Mária Bielíková, Institute of Informatics and Software Engineering

Additionally, the visualization can answer questions about what the system believes to be true, what it believes to be false and to find relationships between these beliefs, if they exist. It brings also another benefits, since many real-world user models are likely to be large, the visualization helps the user:

1. to get an overview of the whole model,
2. to get a clearer overview of dependencies in the user model, and
3. to adjust the sensitivity of the user model.

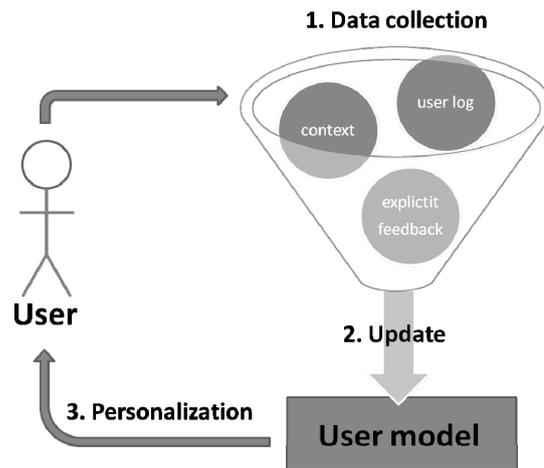


Figure 1. User modelling process can be divided into three steps: user data collection, updating the user model and personalization, which are repeated continuously.

We will experiment with the proposed user model in the Adaptive LEarning Framework (ALEF) in real-world setting, which is used as the e-learning system at the Faculty Informatics and Information Technologies at several courses.

*Acknowledgement.* This work was partially supported by the Cultural and Educational Grant Agency of the Slovak Republic, grant No. KEGA 028-025STU-4/2010.

## References

- [1] Brusilovsky, P., Millán, E.: The Adaptive Web, chapter User Models for Adaptive Hypermedia and Adaptive Educational Systems, LNCS 4321, Springer, pp. 3–53, 2007.